

Response

Appl. No. 09/419,927

REMARKS

The applicant amends the application in response to the Official Action of August 14, 2001.

Claims 1 through 3 are pending. This amendment deletes claims 1 through 3 and adds claims 4 through 9.

The applicant requests an interview with the Examiner. An interview is believed to be necessary in order to better differentiate the applicant's discovery of extensin absent the tetra-hydroxyproline block from other extensin compositions.

1. Election/Restriction Requirement

Claims 4 through 9 are directed to elected Group I. The applicant acknowledges that the computer readable form complies with the U.S. sequence rules.

2. Specification

The Examiner requests a more descriptive title. The applicant adopts the Examiner's suggested title with the addition of the word "optionally" in reference to the composition containing pectic polysaccharides.

3. Claim Rejection Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejects claim 1 under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner requests clarification as to whether the independent claim recited extensin alone or extensin in combination with

the alternative extensin with either pectin or

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polysaccharides. The applicant presents new claims without alternative language. The optional compounds are recited in the dependent claims. Support for the new claims is found in the original claims, on page 8 at lines 17 through 25, and in the examples on pages 13 and 14. This rejection should be withdrawn.

4. Claim Rejection Under 35 U.S.C. § 102

The Examiner rejects claim 1 under 35 U.S.C. § 102 as being anticipated by an article from Plant Physiology by Qi et al. The applicant traverses this rejection and requests reconsideration.

The applicant describes his invention on page 8 of the application at lines 10 through 28 as being a composition of extensin absent the tetra-hydroxyproline block. The applicant's extensin can be derived from the sugar beet.

The Examiner's cited article discloses an extensin composition from cotton. The abstract of the article clearly identifies the extensin as including blocks of peptide sequences having four or more hydroxyproline peptides. These extensin sequences are "(a) serine-Hyp-Hyp-Hyp-Hyp-Hyp-Hyp-serine-Hyp-Hyp-lysine, (b) serine-Hyp-Hyp-Hyp-Hyp-valine-lysine" The article to Qi et al., therefore, does not anticipate the applicant's claimed extensin. This rejection

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Respectfully submitted,

Date _____

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ANNOTATED AMENDMENTS TO THE SPECIFICATION

Please amend the specification in the paragraph beginning on page 8 at line 8 and ending on page 9 at line 14 as follows.

Extensin is synthesized as a soluble monomer and subsequently polymerized into an insoluble polymer in the cell wall. The Golgi apparatus is the site of assembly of glycoproteins. The protein moiety of extensin is about one-third of the total weight, and abundant amino acids are [trans-4-L- hydroxyproline] trans-4-L-hydroxyproline to which are attached short carbohydrate side chains: serine, valine, tyrosine, histidine, threonine, and lysine. Repeating motifs are commonly recognized, e.g., Ser-Hyp4 and Val-Tyr-Lys, and similarities exist between different plant species. However, the tetra-hydroxyproline block has not been found in the sugar beet in which the sequence is interrupted:

[Ser-Hyp2-S-Hyp2-Thr-Hyp-Val-Tyr-Lys] Ser-Hyp2-X-Hyp2-Thr-Hyp-Val-Tyr-Lys. Here X represents an insertion of Val-His-Glu/Lys-Tyr-Pro. Apart from this, the sugar beet extensin has a repeating sequence of amino acids analogous to the sequences found in tomato (*Lycopersicon esculentum*), carrot (*Daucus*

hydroxyproline) and other plant species. The modification by prolyl hydroxylases (E.C. 1.14.11.2), that may

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depend on the amino acid sequence in the extensin molecules. Thus, the dipeptide sequences Lys-Pro, Tyr-Pro, and Phe-Pro are not found to be hydroxylated in contrast to Pro-Val. Complete sequences of extensins are not easily determined because they are usually very insoluble. One approach is to investigate the soluble precursors of extensin, or to screen for extensin in a cDNA library. In dicots, hydroxyproline residues may be O-glycosylated with a single sugar (arabinose or galactose) or up to four Araf residues in an arabino-oligosaccharide. Most of the serine residues, e.g., the Ser-Hyp4 repeats in particular, are O-glycosylated with a single Galp residue. Prolyl hydroxylase appears to be an important enzyme for normal cell morphology. Tobacco protoplasts treated with micromolar concentrations of 3,4-dehydro-L-proline, which is a selective inhibitor of prolyl hydroxylase, developed an abnormal cell wall structure, and cell division was inhibited.

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Please amend the specification in the paragraph beginning on page 10 at line 21 and ending on page 11 at line 3 as follows.

Following in vitro testing of polysaccharides found in pectin, we have done scientific in vitro experiments to test synergistic effects of pectic molecules and extensin. We identified that a combination of pectic molecules with the protein extensin containing valine, tyrosine, histidine, threonine, and lysine can activate [eycarotic [eukaryotic?] cells] eukaryotic cells in significantly smaller concentrations than pectic molecules alone. A combination of pectin with extensin in a ratio higher than seen in natural plant cells can be used as a therapeutic method to modulate immune responses in the treatment of a broad variety of disorders including infections and cancers.

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ANNOTATED AMENDMENTS TO THE CLAIMS

Please delete claims 1 through 3 without prejudice.

Please insert claims 4 through 9 as follows.

4. (New) A composition comprising:

a protein of extensin, said protein being absent a tetra-hydroxyproline block and in a pharmaceutically active concentration sufficient for cytotoxic enhancement of lymphocytes.

5. (New) The composition of claim 4 wherein said protein of extensin is sugar beet extensin.

6. (New) The composition of claim 5 wherein said protein of extensin includes a sequence

Ser-Hyp2-X-Hyp2-Thr-Hyp-Val-Tyr-Lys

wherein X represents an insertion of Val-His-Glu or Lys-Tyr-Pro.

7. (New) The composition of claim 4 further comprising sugar beet fiber.

8. (New) The composition of claim 4 further comprising sugar beet pectin.

9. (New) The composition of claim 6 further comprising pectic polysaccharides.